

**Amendments to the Claims**

This listing of claims will replace all prior version, and listings, of claims in the application:

**Listing of Claims:**

1-17. (Cancelled)

18. (Currently Amended) A quantum ridge product comprising: a substrate having a plurality of substantially parallel quantum ridges on a surface thereof, each pair of adjacent quantum ridges of said plurality of quantum ridges having a pitch of ~~59.4Å~~ to 600Å and being separated by a groove having a width of ~~6Å up to~~ 597Å, at least one of said quantum ridges having a quantum wire supported on top of said at least one quantum ridge and extending in a direction along the length of said quantum ridge, said quantum wire comprising a conductive material ~~having a width of 3Å to 594Å.~~

19-22. (Canceled)

23. (Currently Amended) The product of claim 18, wherein said at least one quantum ridge having a quantum wire supported thereon comprises at least two quantum ridges and each of said quantum ridges has a respective quantum wire supported on top thereof and extending in a direction along the length thereof, ~~each of said respective quantum wires having a width of 3Å to 594Å.~~

24. (Original) The product of claim 18, wherein said substrate comprises a semiconductor material.

25-27. (Cancelled)

28. (Original) The product of claim 18, wherein said quantum wire comprises metal.

29. (Original) The product of claim 18, further comprising a larger band gap material which covers at least a portion of said quantum wire, said larger band gap material having larger band gap than said quantum wire.

30-32. (Canceled)

33. (Original) The product of claim 18, wherein said substrate has a (1 1 4) surface structure.

34. (Original) The product of claim 18, wherein said substrate has a (5 5 12) surface structure.

35-38. (Cancelled)

39. (Original) A quantum tip product comprising a substrate having a plurality of quantum tips on a surface thereof, each of said plurality of quantum tips being separated from adjacent quantum tips by grooves, each of said grooves having a width of 6-up to 597Å and a depth of 4 to 30,000Å.

40-41. (Cancelled)

42. (Original) The product of claim 39, wherein each of said quantum tips is separated from a first set of two of said adjacent quantum tips in a first direction by a first pair of substantially parallel grooves and is separated from a second set of two of said adjacent quantum tips in a second direction by a second pair of substantially parallel grooves, said first and said second direction being perpendicular to each other.

43-44. (Cancelled)

45. (Original) The product of claim 39, wherein said substrate comprises a semiconductor material.

46-48. (Cancelled)

49. (Original) The product of claim 39, wherein said substrate has a (1 1 4) surface structure.

50. (Original) The product of claim 39, wherein said substrate has a (5 5 12) surface structure.

51-56. (Cancelled)

57. (Currently Amended) ~~A The quantum tip product of claim 39, wherein comprising a substrate having a plurality of quantum tips on a surface thereof, each of said plurality of quantum tips being separated from adjacent quantum tips by grooves, each of said grooves having a width of 6Å to 597Å, at least one of said quantum tips having a quantum dot supported on top of said at least one quantum tip said quantum dot comprising a conductive material having a width of 3Å to 594Å.~~

58-68. (Canceled)

69. (Original) The product of claim 57, wherein said quantum dot comprises metal.

70. (Currently Amended) The product of claim 57, further comprising a larger band gap material which covers at least a portion of said quantum dot, said larger band gap material having larger band gap than said quantum ~~wire~~ dot.

71-79. (Cancelled)

80. (Currently Amended) A method for making a quantum structure product comprising the steps of:

providing a first substrate having a (1 1 X) surface structure and including a plurality of substantially parallel quantum ridges and grooves on a surface thereof, the grooves having a width of 6Å up to 597Å and separating adjacent quantum ridges; and

coating the first substrate with a metal to form at least one quantum wire on at least one of the quantum ridges, ~~the at least one quantum wire having a width of 3 Å to 594 Å.~~

81. (Original) The method of claim 80, wherein said substrate is formed by the following steps:

heating pre-substrate having a (1 1 X) surface structure to remove surface oxides;  
and  
cooling the pre-substrate to about -20°C to 900°C to form the first substrate.

82. (Canceled)

83. (Original) The method of claim 80, wherein said first substrate is formed by the following steps:

heating a pre-substrate comprising Si having a (1 1 X) surface structure at a pressure of  $10^{-10}$  torr and about 1150° C to remove surface oxides; and  
cooling the pre-substrate to about 1°K to 253°K to form the first substrate.

84-90. (Canceled)

91. (Original) The method of claim 80, further comprising the step of removing the quantum wires.

92. (Original) The method of claim 80, further comprising the step of inactivating portions of the at least one quantum wire to form quantum dots.

93-139. (Canceled)